

Analysis of Affecting Factors on the Natural Rubber Exports Volume in North Sumatera

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Abstract. North Sumatra is the second largest natural rubber producing province in Indonesia so it has a considerable influence on Indonesia's rubber export activities, however, the export volume of rubber from North Sumatra has fluctuated. The aims of this research were to analyze the factors that influence the volume of natural rubber exports in North Sumatra. The analytical method used is quantitative analysis method in the form of robust regression analysis. The data used in this study are time series data from 1989-2018 using annual data. The results showed that North Sumatra's natural rubber production, natural rubber export price, exchange rate, and inflation simultaneously had a significant and significant effect on the export volume of North Sumatra's natural rubber. North Sumatra natural rubber production, natural rubber export prices, and the exchange rate partially have a real and significant effect on the export volume of natural rubber in North Sumatra, while inflation does not partially affect the export volume of North Sumatra natural rubber.

Keywords: export, natural rubber, North Sumatera

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1. Introduction

Rubber plants are a leading commodity in the plantation sector. This is because rubber plants act as providers of industrial raw materials. Almost all parts of the rubber plant can be used as goods of economic value. This part includes sap, wood, and seeds. Product diversification made from sap, wood and rubber seeds is very diverse due to increasing technology and consumer demand.

Rubber plant is an agricultural commodity that has an important role. The rubber commodity

h, creating employment opportunities, as a source of foreign exchange, as well as preserving the environment and biological resources. In addition, rubber is also the second largest commodity after palm oil in terms of exports of the plantation sub sector.

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North Sumatra is the second largest natural rubber producing province in Indonesia after South Sumatra so it has a considerable influence on Indonesia's rubber export activities. North Sumatra natural rubber has bright prospects in the future to be developed considering that exports are increasing every year. Rubber is still one of the *prima donna* of North Sumatra's non-oil and gas exports, from the colonial period to the current reform era [1].

The development of North Sumatra's rubber export volume from 2013-2017 continued to fluctuate. The development of North Sumatra's natural rubber export volume from 2013-2017 can be seen in Table 1.

Table 1. The Development of North Sumatra's Natural Rubber Export Volume 2013-2018

Year	Export Volume (Ton)	Growth
2013	693,877	-0.09
2014	625,525	-0.04
2015	597,446	-0.06
2016	556,839	0.16
2017	650,081	-0.08
2018	597,350	

Source: Badan Pusat Statistik, 2019

From Table 1, it can be seen that the volume of North Sumatra rubber exports has fluctuated. There was a decrease in the volume of exports in 2014, 2015 and 2016. Whereas in 2017 there was an increase in the volume of rubber exports, but in 2018 the volume of rubber exports declined again. There are several factors that can affect the volume and value of a country's exports, namely foreign income and output, production, the exchange rate (exchange rate), the relative price of domestic and foreign goods, and the rate of inflation. If the output (production) of a country increases, the country's export volume will also tend to increase.

The export price also affects the export volume because if the export price increases, the exporter will increase the quantity of goods offered. The effect of exchange rates on exports occurs when the exchange rate weakens, so exports increase or increase. Inflation can have a negative or positive effect on exports. The negative effect of inflation is that when inflation occurs, the price of the commodity will increase, and it will make the commodity unable to compete in the global market.

Factors that can affect rubber exports can also be seen in previous research, such as research conducted by [2] entitled Analysis of Indonesian Rubber Export Prospects to Japan with the results of research on production and exchange rates have a positive effect while world rubber prices and changes in GDP Japan has a negative effect on the volume of Indonesian rubber exports to Japan.

The difference between this study and previous research includes the use of variables, the period and place of the study, as well as the research method. This study uses variable data on rubber production, rubber export prices, inflation and the value of the rupiah exchange rate. Meanwhile, previous journals discussed more about gross domestic products and world rubber prices. The analytical tool used in this study is the Robust regression analysis. In addition, the equation of this study with previous research is that both discuss the factors that influence the factors that affect the export volume of rubber.

There is an increase and decrease in the volume of rubber exports in North Sumatra from year to year, so research is needed on the factors that affect the volume of rubber exports to see what influences the fluctuation in the volume of rubber exports in North Sumatra. natural rubber exports in North Sumatra.

2. Method

2.1. Method of Collecting Data

The data used in this study is secondary data in the form of time series data with a range from 1989 to 2018 using annual data. Secondary data used in this study were obtained from the Central Statistics Agency (BPS) of North Sumatra Province, the Association of Indonesian Rubber Companies (GAPKINDO), other relevant agencies and various literatures related to this study. Types of data collected include North Sumatra rubber production, natural rubber export prices, exchange rates, inflation and the export volume of North Sumatra natural rubber.

2.2. Data Analysis Method

The data and information obtained will be analyzed quantitatively. Quantitative analysis is a robust regression analysis method.

2.3. Robust Regression Analysis

To test the second problem regarding the factors that influence natural rubber exports in North Sumatra, a robust regression analysis is used, which is a regression method used when the distribution of errors is not normal and/or there are outliers that affect the model [3]. Robust regression is used to detect outliers and provide results that are resistant to the presence of outliers.

Robust regression analysis is a statistical analysis to show the relationship between two or more variables. In this study, the variables used were the variables of natural rubber production in North Sumatra, natural rubber export prices, exchange rates, inflation rate, and export volume of natural rubber in North Sumatra. After entering the research variables, the form of the robust regression equation is written as follows:

$$\text{Log } Y = +\beta_1 \text{Log Prod}_t + \beta_2 \text{Log HKA}_t + \beta_3 \text{Log NT}_t + \beta_4 \text{INF}_t + \varepsilon_t$$

where: $\text{Log } Y$ = the volume of natural rubber exports in North Sumatra; Log Prod_t = North Sumatra natural rubber production; Log HKA_t = export price of natural rubber; Log NT_t = Rupiah exchange rate against the United States dollar; INF_t = inflation; β_0 = intercept; $\beta_1 - \beta_4$ = regression coefficient; t = year; ε_t = error.

3. Result and Discussion

The results of robust regression can be seen in Table 2.

Table 2. The Results of Robust Regression

No.	Variable	Coefficient	Standard error	Sig.
1	(constant)	4,685497	0,813706	0,0000
2	Log Prod_t	0,388885	0,166444	0,0195
3	Log HKA_t	0,158394	0,032463	0,0000
4	Log NT_t	0,092005	0,036830	0,0125
5	INF_t	0,000907	0,000466	0,0516
6	R^2			0,7311
7	Uji F			23,3169

Source: Output Eviews

From Table 2. the robust regression equation is obtained as follows:

$$Y = 4.685497 + 0.388885 \text{ Log Prod}_t + 0.158394 \text{ Log HKA}_t + 0.092005 \text{ Log NT}_t + 0.000907 \text{ INF}_t$$

3.1. Coefficient of Determination (R^2)

The value of R^2 is 0.7311 which means 73.11% of the dependent variable, namely the export volume of natural rubber in North Sumatra, can be explained by the independent variables, namely North Sumatra natural rubber production, natural rubber export prices, exchange rates, and inflation. While the remaining 26.89% is explained by other variables that are not included in the model, such as the gross domestic product variable.

3.2. F Test (Simultaneous Test)

Calculated F value of 23.3169 with a significance level of $0.000 < 0.05$. This shows that H_0 rejected and H_1 accepted, which means that independent variable production of natural rubber, natural rubber export prices, exchange rates, and inflation significantly affect the volume of exports of natural rubber.

3.3. Effect of North Sumatra Natural Rubber Production on the Export Volume of North Sumatra Natural Rubber

The regression coefficient for natural rubber production is 0.388885 which means that there is a positive and significant influence between natural rubber production and the export volume of natural rubber in North Sumatra. If natural rubber production increases by 1%, the volume of

natural rubber exports will increase by 0.388885%. This is in accordance with the hypothesis which states that natural rubber production has a positive effect on the volume of natural rubber exports in North Sumatra. The significance value of North Sumatra natural rubber production is $0.0195 < \alpha_{(0.05)}$. This shows that H_0 is rejected and H_1 is accepted, it means that the production of natural rubber partially has a significant effect on the export volume of natural rubber in North Sumatra.

[4] states that the rubber production variable has a positive effect on the volume of rubber exports and the regression coefficient value is 1.350, which means that if natural rubber production increases by one unit, rubber exports will increase by 1.350 one unit. [5] stated that the increase in the volume of Indonesian rubber exports was due to the increase in the amount of rubber production and due to the expansion of Indonesian rubber plantations. Effect of Export Prices of Natural Rubber on Rubber Export Volume Nature of North Sumatra

3.4. Effect of Exchange Rates on the Export Volume of North Sumatra Natural Rubber

The value of the exchange rate regression coefficient is 0.092005 which means that there is a significant positive effect between the exchange rate and the volume of natural rubber exports. If the exchange rate increases by 1%, the export volume of natural rubber will increase by 0.092005%. These results are in accordance with the hypothesis which states that the exchange rate has a positive effect on the volume of natural rubber exports in North Sumatra. The significance value of the export price of natural rubber is $0.0125 < \alpha (0.05)$. This shows that H_0 is rejected and H_1 is accepted, which means that the exchange rate partially has a significant effect on the export volume of natural rubber in North Sumatra.

[2] with her research where changes in the value of the rupiah exchange rate against the dollar have a positive effect on changes in export volume with a coefficient of 4.005. This means that if the change in the value of the rupiah exchange rate against the dollar weakens by 100 rupiah, *ceteris paribus*, it will increase the change in export volume by 400.5 metric tons.

This means that the weakening of the rupiah exchange rate will increase export commodities. The weakening of the exchange rate will increase the competitiveness of export commodities. The weakening of the rupiah exchange rate against the US dollar will make the competitiveness of natural rubber abroad become competitive because the price of natural rubber in North Sumatra will be relatively cheaper. This means that importing countries as consumers will prefer cheaper natural rubber from North Sumatra, so that the export volume of natural rubber will increase.

3.5. Effect of Inflation on the Export Volume of North Sumatra Natural Rubber

The significance value of the inflation variable is $0.0516 > \alpha_{(0.05)}$. This shows that H_0 is accepted and H_1 is rejected, which means that the inflation variable partially has no significant effect on

the export volume of natural rubber in North Sumatra. These results are not in accordance with the hypothesis which states that inflation has a significant effect on the volume of natural rubber exports in North Sumatra.

[6] with the results of research that the inflation variable does not have a significant effect on Indonesian rubber exports with a degree of confidence of 95%. The t test results show a significant t of $0.0926 > 0.05$ and the coefficient is 0.0011. The insignificant effect of inflation on natural rubber exports in North Sumatra. This is in accordance with the theory expressed by [7] that exports can be influenced by factors other than the macroeconomic condition of a country, including changes in the taste of the foreign population or demand from importing countries.

4. Conclusion

Natural rubber production, natural rubber export prices, exchange rates, and inflation have a significant effect on the export volume of natural rubber. Natural rubber production, natural rubber export prices, and the exchange rate partially have a significant effect on the export volume of natural rubber, while inflation does not partially have a significant effect on the export volume of natural rubber in North Sumatra.

For the government to maintain the stability of the exchange rate against the dollar and keep inflation from getting too high. If the exchange rate is stable, it will encourage the public and entrepreneurs to carry out international trade activities, especially export activities. In addition, the government is also expected to always maintain good relations with export destination countries, so that the agreement on rubber export, in this case especially the determination of the price of rubber, can be more profitable for rubber farmers. For future researchers who will continue research in order to add several other variables in the study and add the time span of the study to obtain a more significant effect. Apart from that, it is also possible to continue research on the export volume of other commodities in order to find out which government policies have the most influence on exports.

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